

TABLE V.

1800	0.12	1840	0.18	1880	0.23
1810	0.13	1850	0.19	1890	0.24
1820	0.15	1860	0.20	1900	0.26
1830	0.16	1870	0.22		

Units of fifth decimal.

TABLE VI.

h	m	55°	60°	64°	68°	70°	72°	74°	76°	78°	80°
0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	30	0.5	0.8	1.1	1.6	2.0	2.5	3.2	4.2	5.7	8.3
1	0	1.0	1.5	2.1	3.1	3.8	4.7	6.1	8.0	11.0	16.1
	30	1.4	2.1	3.0	4.3	5.3	6.7	8.6	11.4	15.6	22.7
2	0	1.8	2.6	3.6	5.3	6.6	8.2	10.6	13.9	19.1	27.8
	30	2.0	2.9	4.1	5.9	7.3	9.2	11.8	15.3	21.4	32.0
3	0	2.0	3.0	4.2	6.1	7.6	9.5	12.2	16.1	22.1	32.1

The correction for  $6^h - \alpha = +$  the correction for  $\alpha$ .

„ „ „  $6 + \alpha = -$  „ „ „ „  
„ „ „  $12 + \alpha = +$  „ „ „ „

TABLE VII.

1800	0.18	1840	0.26	1880	0.35
1820	0.22	1860	0.31	1900	0.39

TABLE VIII.

$0^h$ or $24^h$	55°	60°	65°	70°	75°	80°	$12^h$ or $12^h$
1 „ 23	0.1	0.1	0.1	0.2	0.2	0.4	11 „ 13
2 „ 22	0.4	0.4	0.5	0.7	0.9	1.4	10 „ 14
3 „ 21	0.7	0.9	1.1	1.4	1.9	2.8	9 „ 15
4 „ 20	1.1	1.3	1.6	2.1	2.8	4.2	8 „ 16
5 „ 19	1.3	1.6	2.0	2.6	3.5	5.3	7 „ 17
6 „ 18	1.4	1.7	2.2	2.8	3.7	5.7	6 „ 18

For North Declinations the factor is negative, and positive for South.

Dunsink :

1885, Dec. 10.

Observations of Double Stars at Windsor, New South Wales.

By John Tebbutt.

The accompanying table contains the results of all the double-star observations made by me to the present date. The  $4\frac{1}{2}$ -inch Equatorial was employed throughout, but it was not driven by clockwork. The steadiness and uniform motion of the slow motion arrangement in Right Ascension were very satisfactory. The greatest difficulty in the work of observation consisted in the measurement of distances when the position angle approached  $90^\circ$  or  $270^\circ$ , but it will be seen that these conditions seldom occurred.

Dec. 1885.

Double Stars at Windsor, N.S.W.

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Name of Star.	Observed Magnitudes.	Approx. place at beginning of Year of Observation. R.A. Declin. South. h m	Year, Month, and Day of Observation.	Fraction of Year.	Position Angle.	Distance.	No. of Measures. Posi- tion. Dis- tance.	Weight of Result.	Mag- nifying Power.	Obs. E. or W. of Merid.	Ref. No. to Remarks.
$\beta$ Toucani	—	0 26.1 63 37	1882 Mar. 18	.21	170.4	27.32	8 7	3	180	W	1
B. A. C. 246	7, 8	0 47.9 70 9	1880 Mar. 15	.20	79.1	20.50	4 4	2	180	W	2
$\rho$ Eridani	—	1 35.2 56 48	" "	.18	231.9	6.51	10 10	3	180	W	3
"	—	" "	" "	.19	233.3	6.23	7 7	2	180	W	4
"	—	" "	May 30	.41	233.4	6.55	6 2	2	—	E	5
"	—	" "	Oct. 7	.77	235.0	6.57	6 6	2	320	E	6
"	—	" "	" "	.78	234.5	6.24	10 10	2	320	E	7
"	—	" "	1882 Mar. 6	.18	233.0	7.01	5 5	2	180	W	8
"	—	1 35.3 56 48	1885 Mar. 11	.19	230.5	7.10	10 10	—	180	W	9
$\theta$ Eridani	6, 6	1 35.4 56 47	1882 Mar. 11	.19	85.0	8.44	5 5	3	180	W	10
12 Eridani	4 $\frac{1}{2}$ , 5 $\frac{1}{2}$	2 53.8 40 47	" "	.20	318.0	—	10 —	2	180	W	11
Lacaille 1181	4, 7	3 7.1 29 27	" "	.13	227.5	7.96	3 3	2	180	W	12
$f$ Eridani	5, 5 $\frac{1}{4}$	3 35.5 40 44	" "	.13	203.0	7.25	5 5	3	180	W	13
$\theta$ Reticuli	6 $\frac{1}{2}$ , 8	3 44.2 37 59	" "	.17	5.4	—	7 —	1	180	W	14
Lacaille 1475	6 $\frac{1}{2}$ , 6 $\frac{1}{2}$	4 16.4 63 33	" "	.21	236.2	6.36	5 5	2	180	W	15
$\iota$ Pictoris	5, 6	4 21.9 57 20	" "	.20	58.2	12.18	5 5	3	180	W	16
Lacaille 2145	8 $\frac{1}{4}$ , 8 $\frac{1}{2}$	4 48.3 53 40	" "	.19	127	2.50	9 5	2	180	W	17
"	8 $\frac{1}{4}$ , 8 $\frac{1}{2}$	6 1.7 48 27	1881 Mar. 19	.21	10.1	2.42	12 4	2	180	W	18
"	—	" "	" "	.22	24.4	—	5 —	1	180	W	19
"	—	6 1.7 48 27	1882 Feb. 21	.14	24.6	—	10 —	1	180	W	20
"	—	" "	" "	.15	23.3	—	12 —	2	180	W	21

Name of Star.	Observed Magnitudes.	Approx. place at beginning of Year of Observation. R.A. Declin. South. h m	Year, Month, and Day of Observation.	Fraction of Year.	Position Angle.	Distance.	No. of Measures. Post- tion. Dis- tance.	Weight of Result.	Mag- nifying Power.	Obs. E. or W. of Merid.	Ref. No. to Remarks.
Lacaille 2145	—	6 17 48 27	1882 Mar. 22	.22	197°	"	10	1	180	W	22
"	—	"	" Nov. 24	.90	162	—	10	—	320	E	23
"	7, 8	6 18 48 27	1885 Mar. 6	.18	204	—	10	—	180	W	24
"	7, 7½	"	" " 10	.19	192	—	15	2	180	W	25
Brisbane 1201	6½, 8	6 119 65 30	" " 10	.19	1168	2052	7	2	180	W	26
V Puppis	6, 8	6 355 48 7	1881 Mar. 16	.20	3182	1269	9	10	180	W	27
Lacaille 2640	7½, 8	7 14 59 0	" " 24	.23	824	—	8	1	320	W	28
"	7½, 8	"	" " 24	.23	796	—	8	1	180	W	29
"	—	7 14 59 0	1882 Mar. 22	.22	778	—	10	1	180	W	30
Lacaille 2685	7½, 7½	7 81 55 24	1885 Mar. 11	.19	458	710	5	5	180	W	31
γ Argus, A. B.	2, 5	8 59 46 59	1881 Mar. 21	.22	2190	4246	5	3	180	W	32
"	2, 5	"	" " 22	.22	2197	—	10	3	180	E	33
"	2, 5	"	" " 24	.23	2195	—	3	3	180	W	34
γ Argus, A. C.	2, 7½	8 59 46 59	" " 22	.22	1512	—	10	3	180	E	35
"	2, 7½	"	" " 24	.23	1515	6442	4	3	180	W	36
Lacaille 4031	8¼, 8¼	9 437 34 28	" " 17	.21	1265	561	5	1	130	E	37
o Argus	3, 8	9 441 64 31	1880 Apr. 16	.29	1254	494	5	2	—	W	38
Lacaille 4268	—	10 155 64 6	1885 Mar. 14	.20	3173	248	10	3	180	E	39
s Velorum	6, 6	10 269 44 27	1881 Mar. 17	.21	2177	1368	5	3	180	E	40
"	6, 6½	10 269 44 28	1882 Mar. 10	.19	2189	1268	5	2	180	E	41
"	6, 6½	10 270 44 29	1885 Mar. 7	.18	2189	1292	10	3	180	E	42

Dec. 1885.

Double Stars at Windsor, N.S.W.

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Name of Star.	Observed Magnitudes.	Approx. place at beginning of Year of Observation. R.A. Declin. South. h m ° ' "	Year, Month, and Day of Observation.	Fraction of Year.	Position Angle.	Distance.	No. of Measures.	Weight of Result.	Mag. nifying Power.	Obs. E. or W. of Merid.	Ref. No. to Remarks.
Lacaille 4350	6½, 7	10 28.6 54 47	1882 Mar. 10	.19	29.4	25.63	3	2	180	E	43
h 4392	8, 8	10 53 70 44	1885 Mar. 19	.21	160.0	25.01	5	2	130	E	44
α Crucis	—	12 19.9 62 26	1880 Feb. 28	.16	120.5	5.11	3	1	180	W	45
"	—	" " "	" Mar. 9	.19	120.9	4.75	3	2	—	W	46
γ Centauri	—	12 35.0 48 19	1882 Mar. 22	.22	2.1	—	10	3	320	E	47
γ Virginis	—	12 35.6 0 47	1880 May 20	.38	157.2	5.83	6	2	320	W	48
"	—	" " "	" " 28	.41	157.1	5.65	7	2	—	W	49
α Centauri	—	14 31.5 60 20	" Feb. 28	.16	185.1	5.10	3	1	180	W	50
"	—	" " "	" Mar. 8	.18	182.6	5.08	6	1	—	W	51
"	—	" " "	" " 8	.18	186.7	4.97	8	2	—	W	52
"	—	" " "	" " 8	.18	181.2	5.72	3	2	180	E	53
"	—	" " "	" May 7	.35	186.4	5.31	10	3	320	E	54
"	—	" " "	" " 28	.41	184.0	5.94	3	2	—	E	55
"	—	" " "	" " 29	.41	185.2	5.43	10	2	—	E	56
"	—	" " "	" Oct. 8	.77	188.7	6.13	8	3	320	W	57
"	—	" " "	1881 Aug. 24	.64	191.8	7.89	8	2	180	W	58
"	—	14 31.5 60 21	" " "	.66	194.5	8.00	8	2	—	W	59
"	—	" " "	" " 30	.22	194.6	8.70	7	3	320	E	60
"	2, 3	14 31.6 60 21	1882 Mar. 22	.52	199.5	12.92	10	2	180	E	61
"	—	14 31.7 60 21	1884 July 9	.52	200.9	13.01	10	2	180	W	62
"	—	" " "	" " 9	.53	198.9	12.68	6	2	180	E	63
"	—	" " "	" " 12								

F 2

Name of Star.	Observed Magnitudes.	Approx. place at beginning of Year of Observation. R.A. Declin. South.	Year, Month, and Day of Observation.	Fraction of Year.	Position Angle.	Distance.	No. of Measures. Position. Distance.	Weight of Result.	Mag. of nifying Power.	Obs. E. or W. of Merid.	Ref. No. to Remarks.
$\alpha$ Centauri	—	h m 14 31.7 60 21	1884 July 12	.53	199.4	13.07	6 6	1	180	W	64
"	—	" " "	" " 18	.55	198.9	12.98	8 8	3	180	E	65
"	—	" " "	" " 18	.55	201.2	12.92	8 8	2	180	W	66
"	—	14 31.8 60 22	1885 July 11	.52	198.6	13.47	4 5	3	—	E	67
"	—	" " "	" " 11	.52	201.7	14.03	4 5	1	—	W	68
"	—	" " "	" " 27	.57	199.8	14.40	7 7	3	—	E	69
"	—	" " "	" " 27	.57	202.0	14.17	7 7	2	—	W	70
"	—	" " "	" " 31	.58	200.8	14.08	10 10	3	—	E	71
"	—	" " "	" " 31	.58	201.2	14.17	10 10	2	—	W	72
"	—	" " "	" Aug. 3	.59	201.1	—	10 —	3	—	E	73
"	—	" " "	" " 3	.59	201.2	—	10 —	2	—	W	74
$\alpha$ Circini	—	14 33.2 64 28	" " 8	.60	239.2	15.95	5 5	1	—	W	75
$\mu$ Lupi	5, 5½	15 10.3 47 26	1882 Mar. 10	.19	160.5	—	8 —	—	320	E	76
Lacaille 6477	7, 7	15 37.4 65 5	1885 Aug. 8	.60	152.2	2.32	5 5	2	—	W	77
$\xi$ Lupi	6, 6½	15 49.3 33 37	1881 Aug. 30	.66	49.9	10.55	5 5	3	—	W	78
$\eta$ Lupi	4, 7½	15 52.2 38 3	" Sept. 8	.69	20.3	14.93	6 6	3	180	W	79
"	5, 9	15 52.5 38 4	1885 Aug. 1	.58	19.7	15.21	5 5	2	180	W	80
36 Ophiuchi	6, 6	17 8.0 26 25	1881 Sept. 8	.69	200.6	4.77	5 5	2	320	W	81
Lacaille 7267	7½, 8	17 18.4 45 44	1885 Aug. 1	.58	264.5	2.85	10 5	3	180	E	82
$\kappa$ Coronæ Aust.	5½, 7	18 25.2 38 49	1881 Sept. 10	.69	0.7	21.95	3 3	1	320	W	83
Lacaille 7924	8, 8	18 53.2 63 57	1885 Aug. 5	.59	110.7	2.14	10 5	1	—	E	84

Name of Star.	Observed Magnitudes.	Approx. place at beginning of Year of Observation. R.A. Declin. South. h m °	Year, Month, and Day of Observation.	Fraction of Year.	Position Angle.	Distance.	No. of Measures.	Weight of Result.	Mag. E. or W. Power.	Obs. E. or W. Merid.	Ref. No. to Remarks.
<i>h</i> 5092	8, 8½	19 5 47 33	1885 July 30	.58	351° 8	17.58	5	3	180	E	85
Lacaille 8443	7½, 8	20 28.0 75 45	" " 31	.58	15° 9	17.46	7	3	—	E	86
Lacaille 8550	7, 7	20 42.0 62 51	" Aug. 4	.59	96° 9	3.12	8	3	180	E	87
Lacaille 8687	8½, 8½	21 20 55 2	" July 27	.57	122° 5	3.65	10	3	90	E	88
θ Indi	6, 8	21 11.7 53 56	" " 30	.58	288° 2	4.40	5	3	180	E	89

Remarks.

1. It was difficult to decide which was the brighter component, but that in the north preceding quadrant was probably so.
- 3, 4, 5, 6, 7. The same difficulty presented itself, but I think the north following was the brighter.
8. Although the components were very nearly equal, there was no doubt about the north following star being the brighter.
9. It was impossible to determine which was the brighter. 11. Estimated distance = 1" 5. 14. Companion seen with difficulty.
15. It was difficult to decide which was the brighter. 17. One or both of these stars probably variable. 24. Estimated distance = 1"
25. On setting the position circle to 12° the deviation of the line joining the components from parallelism to the position threads was very sensible. 28, 29. Estimated distance = 2" 0. 30. Estimated distance = 2" 5.
31. Impossible to decide which was the brighter. 37. The components were equal. 40. The following component the brighter.
- 41, 42. Both the Cape and Sydney Catalogues make the components equal, and place the angle in the first quadrant. On March 10, 1882, and March 7, 1885, the north following star was decidedly the brighter. 44. The north preceding star probably the brighter.
47. Components exactly equal: estimated distance = 2" 0. 49. The north star apparently the brighter.
- 67, 68. The distances are deduced from the observed position angle and differences of declination.
76. Estimated distance = 2" 0. 80. The Sydney Catalogue gives the distances as 7.06 in 1879.
81. Difficult to decide which was the brighter, but probably the northern star. The magnitudes assigned to the components in the *Handbook of Double Stars* by Crossley, Gledhill, and Wilson are 4½ and 6½. 84. Components equal, hazy, and ill-defined.

Windsor, N.S. Wales:  
1885, Oct. 9.

*Observations of Magnitude of Nova Andromedæ made at the  
Radcliffe Observatory, Oxford.*

(Communicated by E. J. Stone, M.A., F.R.S.)

The following estimations of magnitude of *Nova Andromedæ* were made with the 10-foot Equatorial of 7-inch aperture, except on September 19 and 21, when the Heliometer, of which the aperture is 7·5, was used.

Day and Hour.		Observed Magnitude.	Observer.	Power used.	
	h				
Sept.	9	10	8.0	R.	45 (a)
	17	10	8.5	W.	45 (b)
	18	9	8.5	W.	45
	19	10½	8.5	W.	45
	21	10½	9.2	W.	45
	22	8	9.5	W.	45
		9½	9.3	R.	45
	24	10	9.6	W.	45 (c)
	25	9¾	8.7 (d)	R.	45
		9¾	9.6	W.	45
	26	8½	10.0	F.B.	125
	29	9½	10.7	F.B.	125
		9½	11.0	R.	125
		9½	10.3	W.	45
	30	9	10.7	F.B.	125
Oct.	1	8	10.9	W.	125
	3	9½	10.8	F.B.	125 and 160
	5	6½	10.7	R.	160
		8	10.7	F.B.	125
		9	10.6	W.	125 (e)
	7	8	11.3	F.B.	125
	12	10	11.2	F.B.	125
	16	9	11.2	R.	160
		9½	11.1	F.B.	160
	27	7½	11.7	F.B.	125
		7½	12.0	W.	125
Nov.	5	9½	12.6	F.B.	125
	28	7½	13.5	F.B.	125 and 160
Dec.	1	8	—	F.B.	125 (f)
	4	8	13.6	F.B.	160 and 295 (g)
	10	8	14.0	F.B.	295 (h)

The following observations of magnitude were made with the Transit circle:—

Day and Hour.		Observed Magnitude.	Observer.	Power used.	
	h				
Sept.	21	12 $\frac{1}{2}$	9·7	R.	80
	25	12 $\frac{1}{3}$	9·5	R.	115
	26	12 $\frac{1}{4}$	9·7	F.B.	143
	30	12	10·2	F.B.	143
Oct.	5	11 $\frac{3}{4}$	10·4	R.	143

*Remarks.*

(a) Reddish; very slightly fainter than Arg. Z+40°, No. 165 (mag. 7·9) and No. 167 (mag. 7·7).